

17
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Light ions fly faster, heavy ones slower, but they all fly in the same direction. The drift section of the time-of-flight mass spectrometer must be completely surrounded by the acceleration potential (not shown in Figure 1 for reasons of simplicity) in order not to disturb the ions in their flight.

Please substitute the following Abstract for the Abstract on page 13:

Abstract

18

The invention relates to a time-of-flight mass spectrometer for injection of the ions orthogonally to the time-resolving axis-of-flight component, with a pulser for acceleration of the ions of the beam in the axis-of-flight direction, [preferredly] preferably with a velocity-focusing reflector for reflecting the ion beam and with a flat detector at the end of the flight section. The invention consists of using, both for acceleration in the pulser and for reflection in the reflectors, a gridless optical system made up of slit diaphragms which can spatially focus the ions onto the detector in the direction vertical to the directions of injection and flight axis, but which does not have any focusing or deflecting effect on the other directions. For some reflector geometries it is essential to use an additional cylindrical lens for focusing, and for other reflector geometries the use of such a lens may be advantageous.

Please substitute the following claims for pending claims with the same numbers.

1. A time-of-flight mass spectrometer with injection of a narrowly defined ion beam having ions which fly in a direction parallel to an axis x, the spectrometer comprising:
 - a pulser which accelerates, in pulses, a segment of the ion beam with a gridless slit diaphragm that extends parallel to the x-axis, the acceleration being parallel to an axis y that is perpendicular to the x-axis so that the accelerated ions form a band-shaped ion beam;
 - at least one electrical reflector that receives the ion beam from the pulser and accelerates it with a gridless slit diaphragm that extends in the x-direction,